of the teeth designated. In these the external crescents are more compressed and less conical than the two species above described, resembling more nearly those of the *L. evansii.* The posterior has a weak vertical rib; the anterior a strong one. The external cingular cusps are thoroughly fused with the external crescents, forming their anterior horns. The anterior horns of the internal crescents are a little more produced than the posterior. No external or posterior cingulum; a much interrupted anterior cingulum, which is continued round the internal base of the anterior crescent, which is further continued on the anterior side of the internal base of the posterior crescent. Enamel finely wrinkled. Diameters; anteroposterior 14 mm.; transverse, at base, 15 mm.

Oreodontidæ, an inferior first premolar.

Elotherium mortoni Leidy; l. c.

Remarks.

The continued scarcity of Oreodontidæ is matter of surprise. Their place is supplied so far, by an increased number of Tragulidæ (four species). The presence of a genus of Lambdotheriidæ, Haplacodon, increases the impression of antiquity of the fauna produced by the presence of a Creodont (Hemipsalodon.)

MINERALOGY AND PETROGRAPHY.[1]

PETROGRAPHICAL NEWS.—Interbedded with the Tertiary schists of the western Cordilleras in Peru and Bolivia, are andesites, which are divided by Rudolph[2] into a western area of pyroxene-andesites, an eastern area of horn blende-andesites and a middle area of a variety intermediate between these two. The structure of each class varies from those types in which there is a devitrified glassy groundmass, to those in which the groundmass is microcrystalline. The plagioclase is andesin that has suffered alteration in the center because of the more basic character of this portion. The pyroxene-andesites contain augite twinned parallel to $P\bar{\infty}$, and also an orthorombic pyroxene with a cleavage parallel to $\infty P\bar{\infty}$ and a parting parallel to $0P$. Both augites have in some cases undergone alteration into bastite. By an increase in the amount of hornblende the

[1] Edited by Dr. W. S. Bayley, Colby University, Waterville, Maine.

[2] Miner. u. Petrog. Mitth. ix. p. 269.

pyroxene variety passes over into the typical hornblende-andesite through stages in which hornblende and pyroxene are both present, the amount of the one increasing with diminution in the amount of the other. The hornblende is often surrounded by an opacitic rim in which are frequently numerous little crystals of augite. Tridymite is both an original and a secondary constituent in all varieties of the andesites, with the exception of the dacites in the extreme eastern portion of the area studied, where the silica is in the form of opal and porphyritic quartzes. The biotite present in many specimens contains apatite and rutile inclusions regularly arranged, the former with their long axes perpendicular and parallel to the *c* axis of the mica, and the latter cutting each other at angles of 60°. The author describes the course of a silicification process which has taken place in some of the rocks, and also the eutaxitic structure noted in many of them.—Of the Andes mountains in Colombia four distinct ranges are recognized, viz: the Western, Central, Eastern and Coast Cordilleras. The structure and the rocks of the Central and Eastern ranges have recently been studied by Hettner and Linck.[1] In the former granite, gneiss, crystalline schists, diabase, dacites, andesites and clay slates occur. The crystalline schists and the slates are regarded as Archaean. In the Eastern range none of the younger rocks were found, except a tuff composed of andesite material. Among the older rocks found in this area may be mentioned a quartzite and a felsophyre.—In a beautifully illustrated paper on the rocks between the Province of Minas Garaes and São Paulo, in Brazil, Machado[2] describes the gneisses and the sedimentary rocks of the region, nepheline-syenite, quartz-augite-diorite and olivine-diabase. The last mentioned rock occurs in dykeform and presents no unusual features. The diorite forms a stock in the gneiss. It contains in addition to its essential constituents also hypersthene and scapolite. The most interesting portion of the paper is that devoted to the nepheline-syenites. These are pre-Devonian and form the plateau of Poços de Caldas. Three types are distinguished —a coarsely granular, a fine grained and a dense and porphyritic type. They all contain the same components, viz: orthoclase, nepheline, aegerine, biotite, sodalite and cancrinite (as a decomposition product of nepheline), and grade over into one another. Wollastonite, lovenite and epidote also occur in some specimens as accessory constituents. Darker fine

[1] Zeits. d. deutsch. geol. Gesell. XL. 1888. p. 205.

[2] Miner. n. Perog. Mitth. IX. p. 318.

grained varieties of the rock often appear as if included in lighter colored coarser grained kinds, the color of the two rocks depending upon the percentages of augite in them. The dense varietiesoften show a fluidal structure in the arrangement of little microlites of augite, and sometimes possess these in dendritic groups. Rutile is noted as an alteration product of sphene, and several unknown minerals are briefly described.—In an English summary at the end of his book[1] Reusch gives a description of the remarkable geological region of Norway where eruptive, sedimentary, vein and dyke rocks have had developed in them by the action of great pressure, a schistisity which was attended by chemical change in the original constituents of he rock masses. Through processes carefully described the author shows that granite may originate from clastic rocks and afterwards be intruded as an eruptive into other eruptive and clastic rocks in the form of dykes. Gneiss veins are said to be common in the region, and schistose gabbro, diabases and other basic rocks occur in great quantity. The book contains three colored maps and two hundred-and-five wood-cuts of geological sections and sketches of thin section of rocks. From his observations, Reusch draws some important conclusions which will probably explain many of the difficulties met with in solving the problems of the origin of crystalline schists.—A hornblende-peridotite[2] from a hill at the south foot of Kilimandjaro in E. Africa is an allotriomorphic granular aggregate of grass-green hornblende, salmon colored hypersthene and colorless olivine. The hornblende and olivine include rows of opaque rod-like bodies. The hypersthene is pleochroic as follows: a = salmon-red; b = pale yellow; c = sea-green. Pleonast and magnetite are among the other constituents.—A few small isolated patches of a green rock occurring just north of Aberdaron in North Wales, and colored as serpentine on the survey maps of Wales are regarded by Elsden[3] as serpentinized diabases. Unaltered diabases, hornblende-gabbros, and porphyrites from the same region are also briefly described by the author.—Mr. Wethered[4] has discovered well outlined quartz crystals in the insoluble residues of the Carboniferous limestones at Clifton, England, that have resulted by the enlargement of fragmental quartz grains by the deposition of silica derived from organic sources.—In the

[1] Bommeloen og Karmoen med. omgivelser geologisk beskrevne. Kristiania. 1888.
[2] Hatch: Geol. Magazine, May, 1888. p. 257.
[3] Geol. Magazine, 1888. p. 303
[4] Quart. Jour. Geol. Soc. May, 1888. p. 186.

course of a paper on the Huronian rocks from Sudbury, Canada, Bonney[1] describes altered feldspar fragments in a conglomerate, that have given rise to flakes of mica and interlocking grains of quartz. He points out that the same change on a larger scale might produce a gneiss—a result which has already been indicated by Van Hise.[2]—A rock composed entirely of a mosaic of hornblende and biotite is mentioned by Horton[3] as having been collected at Dosky Sound, New Zealand.—Jade has been found by Von Fellenberg[4] on the contact between limestone and serpentine on the Pizzo Lunghino, near the Maloja Pass in the Alps.

MINERALOGICAL NEWS.—In a Bulletin of the New York State Museum[5] F. L. Nason describes some fine crystals of brown *tourmaline* from Newcomb, Essex Co., N. Y. of *pyroxene* from Ticonderoga in the same county, and of some *calcites* collected by the late Prof. E. Emmons at Rossie, St. Lawrence Co. The brown *tourmalines* occur in Laurentian limestone, and present in general the features of the well-known Gouverneur mineral. They are associated with graphite, apatite, sphene, wernerite, quartz, zircon, muscovite, albite, tremolite, pyroxene and pyrite. Some of the crystals are of large size and others are so flawless as to have yielded fine gem material. A characteristic grouping is that in which a number of parallel growths are terminated at one end by a form common to the entire group, while at the other end each individual has an independent termination. Some of the *sphenes* exhale a feted odor when struck, and many of them include rutile needles with a distinct crystalline form. *Dipyr* crystals of large size are glassy or transparent and enclose crystals of sphene and opaque acicular inclusions arranged with their long axis parallel to the *c* axis of the dipyr. The *calcite* crystals from Rossie are remarkable for the fact that they are all twins. The most common twinning plane is ^{c}P. Twins parallel to ∞P are also quite frequent. Often trillings occur in which two of the crystals are twinned according to one law, and are twinned with reference to the third crystal in accordance with the second law. One set of rhombohedral faces is smooth and glistening while the second set is rough. The pyroxenes are from a vein

[1] ib. Feb. 1888. p. 32.

[2] Amer. Jour. Sci. xxxi. p. 453. AMERICAN NATURALIST, Aug. 1886. p. 723.

[3] Quart. Jour. Geol. Soc. Nov. 1888. p. 745.

[4] Neues Jahrbk für. Min., etc., 1889. I. p. 103.

[5] No. 4. Aug. 1888. Albany.

of calcite in gneiss, which vein has been worked for graphite. These pyroxenes are sometimes eighteen inches in length and thirty-six inches in circumference, and exhibit a parting parallel to oP. The pyroxenes are thought to be older than the calcite but younger than the quartz with which they are associated.—Interesting parallel growths of *andalusite* and *sillimanite* are described and figured by Lacroix[1] from Ceylon and from a metamorphic rock from Morlaix, Finistère, France. In the former instance the two minerals are intergrown with their *c* axes parallel, and in addition two other series of sillimanite crystals cross the principal one at angles of 90° and 45°. The same author finds that *bamlite*, *monrolite*, *bucholzite*, *xenolite* and *wörthite* are either merely peculiar forms of sillimanite or impure varieties of this mineral.—Two *barium feldspars* from the manganese mines of Söjgrufran, Grythyttan, Sweden have been analyzed by Igleström.[2] The first is a red mineral and the second is white and transparent. Both are insoluble in acids. Their analyses yielded:

	SiO_2	Al_2O_3	FeO	MnO	BaO	MgO	CaO	Na_2O	K_2O
Red feldspar	61.90	15.80	5.00	9.58		1.30	.40	6.02	
White feldspar	54.15	29.60		1.26		1.52	1.00	12.47	

According to Des Cloizeaux the white mineral has the optical properties of albite.—The same mineralogist records the analysis of a clear straw yellow *pyrrhoarsenite*[3] from the same mine. Its composition corresponds to the formula 10 (Ca. Mg. Mn.)$_3$ $(AsO_4)_2$ + Ca_2 Sb_2O_7, and is:

AO_2O_5	Sb_2O_5	CaO	Mno	MgO
53.23	6.54	20.21	10.82	9.20

Gonnard[4] mentions the rare mineral *torbernite* as occurring in quartz veins cutting granite in the neighborhood of Charbonnières les Varennes, Puy-de-Dôme, France. Here are found also fine pseudomorphs of quartz after calcite, the formation of which is explained as having taken place in three stages. 1), by the coating of the calcite crystals by silica; 2), by solution of the calcite, and 3), the filling of the molds left with silicious material mixed with a little clay. Druses of smoky quartz crystals found in the same veins are thought to owe their color to bituminous matter which floated on the surface of the siliceous waters that yielded the quartz and colored those last formed (the druse crystals).

[1]Bull d. l. Soc. Franç. d. Min. 1888. XI. p. 150.
[2]Ib. XI. p. 26.
[3]Neues Jahrb. f. Min., etc. 1889. I. p. 48.
[4]Bul. d. l. Soc. Franç. d. Min. 1888. xi. p. 265.

Rare Minerals.—The interesting zeolite *beaumontite* which has heretofore been known only at Baltimore has lately been discovered by Schmidt[1] in the vacuoles of a pitchstone from Sweden (Mien See.) The mineral has the same habit as the Baltimore crystals. Its double refraction is weak and its optical angle large. The plane of its optical axes is normal to $\infty P\breve{\infty}$ and parallel to the edge which this plane makes with oP. Schmidt can see no reason for regarding the mineral as anything more than a variety of heulandite.—Mr. Hanks[2] has given us an account of the occurrence of the rare mineral *Hanksite* from the vicinity of Borax Lake, San Bernardino Co., Cal. The best crystals have been obtained from a stratum of clay and sand underlying a two foot thick surface-layer of salt and thenardite, and from a second stratum of the same materials at seventy feet below the surface. These crystals are bounded by the planes oP, ∞ P, P, and 2P. When the basal plane is largely developed the crystals become hexagonal plates or columns. They vary in size from half an inch or less to three inches in diameter. Hanksite is known to occur also in the borax fields of Death Valley, Inyo Co., Cal., and at several localities in Nevada.—Recent investigations on the *bertrandite* from a pegmatite vein at Pisek, Bohemia, yield Scharizer[3] results differing slightly from those of Bertrand and Des Cloizeaux, who thought the mineral orthorhombic. Scharizer's measurements show it to be monoclinic with B=90° 28′ 34″ and $a : b : c = 1.7793 : 1 : 1.07505$.

NEW BOOKS.—In the "FIRST REPORT OF PROGRESS OF THE GEOLOGICAL AND MINERALOGICAL SURVEY OF TEXAS,"[4] State Geologist Dumble gives a resumè of the rocks and minerals of economic importance existing within the boundaries of the State. Natural gas, petroleum, salt and coal are known to occur in large quantity within the boundaries of Texas, but the limits of the formations containing them have not yet been carefully mapped.—"A COURSE OF MINERALOGY FOR YOUNG PEOPLE,"[5] is a little pamphlet of sixteen pages which accompanies a collection of twenty-five common minerals. It is intended to aid young people in the determination of the most common minerals by teaching them to observe for themselves their most prominent characteristics. The

[1] Zeits. f. Kryst. xv. p. 573.
[2] Amer. Jour. Sci. 1889. Jan. p. 63.
[3] Zeits. f. Kryst. xiv. p. 17.
[4] Austin. State Printing Office. 1889.
[5] By G. Guttenberg, Erie, Pa.

book and the collection comprise the first portion of a course in mineralogy which has been arranged for the use of the Agassiz associations throughout the country. The price of the pamphlet and the twenty-five minerals which it describes is one dollar.—The principal formal and optical characteristics of the more important rock-forming minerals have been arranged by Rosenbusch[1] in sets of tables covering about twenty-five pages. The tables are of great convenience to students who are far enough advanced in the study of petrography to understand the significance of the terms used in them.

BOTANY.[2]

NOTES ON NEBRASKA LICHENS.—Our knowledge of the Lichen Flora of Nebraska is as yet very meager being confined principally to the work of Hayden and Hall during the Government Geological Surveys. Our knowledge, such as it is however, shows that our Lichen Flora has many interesting as well as instructive characteristics. There is a general dearth of the large eastern forms throughout the greater part of the state. There are, however, along the Missouri river and its tributaries, many forms that are found in the eastern states. The Flora of this region serves as a connecting link between the timber forms of the East and the prairie forms of the West. The prairie region has an abundance of earth forms such as Endocarpon, and many Buellias and Biatoras.

Many semi-mountain and mountain forms occur in the western and northwestern parts of the state. Beginning with the eastern border of the state and going west a gradual transition from timber forms to earth forms, is observable; and from these to the forms usually found in higher altitudes as Umbilicaria, Omphalaria, and similar forms.—*T. A. Williams.*

AS TO THE CITATION OF AUTHORITIES.—That the effects of individual eccentricity when given room for free development are always striking, is well shown by the diversity of methods used by botanists in giving authorities for scientific names. In the good old days when but one name, that of the author of the combination, was cited, there was, at least, uniformity and hence some certainty. But the later method

[1] Hülfstabellen zur Mikroskopischen Mineralbestimmung in Gesteinen. Stuttgart, 1888.

[2] This department edited by Dr. C. E. Bessey, Lincoln, Neb.